

PATENT SPECIFICATION

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(72) Inventors: JACK ERNEST DOUGLAS
RICHARD JOHN BIGLEY

(54) IMPROVEMENTS IN OR RELATING TO FASTENERS

(71) We ARTHUR SHAW MANUFACTURING LIMITED, a British Company of P.O. Box 21, Willenhall, West Midlands WV13 2AS., do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be particularly described in and by the following statement:-

This invention concerns improvements in or relating to fasteners e.g. for windows or doors and in particular to fasteners of the kind comprising a handle adapted to be mounted on a first member pivotal relative to a second fixed member and a striker plate adapted to be mounted on the second member, the handle having a lever rotatable to engage the striker plate to secure the first member in a closed position. Such a fastener will hereinafter be referred to as 'of the kind specified'.

The first member usually comprises a glazed sash or door hung on hinges for pivotal movement relative to a fixed window or door frame. The hinges can include any of the type known to those skilled in the art, for example standard butt or rising butt, foldable stays or friction pivot.

Normally the sash or door is a close fit in the fixed window or door frame and consequently there is some frictional resistance both to opening and closing movement of the sash or door. This frictional resistance is greatly increased if, as is quite common, some kind of seal is provided either on the sash or door or on the fixed window or door frame.

A disadvantage of the known fasteners is that in use the user has to apply an excessive force both on opening and closing of the sash or window to overcome the above-mentioned frictional resistance. As a result there is a tendency for the sash or door to twist or turn on its hinges in a direction transverse to the direction of opening or closing of the sash or door causing excessive wear of the hinges. This is particularly undesirable where the hinges comprise foldable stays or friction pivots.

It is an object of the present invention to provide a fastener which substantially overcomes the above described disadvantages and problems of known fasteners.

According to the present invention we provide a fastener of the kind specified wherein cam means provided on one of said lever and

striker plate is engageable with guide means provided on the other of said lever and striker plate on rotation of the lever during closing movement of the first member to move the first member to the said closed position and complementary formations provided on said handle and striker plate are engageable with one another during closing movement of the first member to align the first and second members relative to one another so that on subsequent rotation of the lever the cam means engages the guide means to move the first member to the closed position and the complementary formation co-operate with one another to prevent movement of the first member in a direction transverse to the direction of closing movement of the first member.

It will be understood that the engagement of the complementary formations during closing movement performs two functions, first it ensures the first member is correctly aligned relative to the second member to allow engagement of the cam means and guide means and secondly it effectively prevents the first member twisting or turning on its hinges irrespective of the force applied by the user to move the first member to the closed position, for example to overcome frictional resistance to closing. It will be appreciated that the engagement of the complementary formations will also prevent any undesirable twisting or turning of the first member on its hinges, during initial opening movement of the first member irrespective of the force applied by the user to overcome frictional resistance to opening. In this way wear of the hinges resulting from such undesired twisting and turning movement is prevented.

Preferably the complementary formations comprise an element on the handle and a recess in the striker plate. The element is conveniently formed integrally with the handle, for example on a base of the handle which is adapted to be mounted on the first member. The lever is rotatably mounted on the base and the base may include a pair of relatively spaced stops to limit rotational movement of the lever.

Conveniently cam means and guide means comprise a cam surface and a guide surface respectively, the cam and guide surfaces

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- being so constructed and arranged that in use the cam surface engages the guide surface on rotation of the lever in one sense to move the first member to the closed position.
- 5 Preferably cam means and guide means comprise a further cam surface and a further guide surface respectively, the further cam and guide surfaces being constructed and arranged so that the further cam surface engages the further guide surface on rotation of the lever in the opposed sense to move the first member away from the closed position.
- 10 It will be appreciated that where the cam means and guide means comprise a pair of cam surfaces and a pair of guide surfaces respectively movement of the first member to the closed position and initial opening movement is achieved merely by rotation of the lever and the user does not have to apply any force to 15 overcome frictional resistance to closing or opening of the first member.
- 15 Preferably the cam surfaces are formed by the opposed faces of a nose on the lever and the guide faces are formed by the opposed side walls of a slot in the striker plate.
- 20 The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings wherein:
- 25 Figure 1 is a perspective view of a right hand fastener according to the invention mounted on a window;
- 30 Figure 2 is a plan view of the striker plate showing the first stage of closing with parts of the handle omitted for clarity;
- 35 Figure 3 is a view similar to Figure 2 showing an intermediate stage of closing;
- 35 Figure 4 is a view similar to Figures 2 and 3 showing the final stage of closing;
- 40 Figure 5 is a perspective view of the striker plate shown in Figures 1 to 4;
- 45 Figure 6 is a perspective view of an alternative striker plate; and
- 50 Figure 7 is a vertical section through a centre hung pivot sash and frame;
- 55 The fastener 1 shown in Figures 1 to 5 of the accompanying drawings comprises a handle 2 and a striker plate 3 both formed as castings. The handle 2 is mounted on the wooden frame 4 of a side hung sash and the striker plate 3 is secured to the fixed wooden window frame 5 by screws extending through two openings 3a, 3b in the striker plate. Closing movement of the sash is in the direction of arrow A in Figures 1 to 4.
- 60 The handle 2 comprises a base 6 and a manually operable lever 7 rotatably mounted on the base 6. The base 6 has two lugs 6a, 6b formed with openings through which screws extend to secure the handle to the sash frame 4. The base 6 also has a wedge-shaped element 8 which locates in a complementary shaped recess 9 in the striker plate on closing movement of the sash to correctly align the sash relative to the window frame and prevent any undesirable twisting or turning of the sash about its 65 hinges. The lever 7 has a nose 10 which locates in a slot 11 open at one end in the striker plate to facilitate opening and closing of the sash and to lock the sash in the closed position. Rotational movement of the lever 7 is limited by a pair of relatively spaced stops on the base 6 which engage the nose 10 on the lever. Conveniently the stops comprise the element 8 and an upstanding lug (not shown). The lever is retained in position by friction so that it can be left in the open position shown in Figure 1, when the sash is opened. In the open position the nose 10 is aligned to engage the slot in the striker plate on closing the sash.
- 70 The slot 11 has the shape shown in which the opposed side walls are inclined slightly outwardly from the base to define guide surfaces 11a, 11b. The slot 11 is tapered from the open end 11c towards the closed end 11d. The nose 10 has two cam surfaces 10a, 10b which co-operate with the guide surfaces 11a, 11b respectively when the lever 7 is rotated during opening and closing movement of the sash. The nose 10 is wedge-shaped complementary to the narrow end of the slot 11 and is angled relative to the axis of rotation of the lever so that the cam surfaces 10a, 10b progressively engage the associated guide surface as will be described later.
- 75 The operation of the fastener is as follows, to close the sash starting from the position shown in Figure 1, as the sash is moved in the direction of arrow A the nose 10 engages guide surface 11a on the striker plate and further movement of the sash in the direction of closing is prevented until the lever 7 is rotated. Simultaneously element 8 on the base 6 enters the recess 9 in the striker plate 3 to locate the sash frame in the correct position relative to the window frame. Lever 7 is then rotated in a clockwise direction as viewed in Figure 1 allowing the sash to be pulled further in the direction of closing as cam surface 10a moves over guide surface 11a until the position shown in Figure 2 is reached in which cam surface 10b engages guide surface 11b. On further rotation of lever 7 cam surface 10b moves over and engages guide surface 11b to draw the sash towards the closed position without the user having to pull on the lever 7.
- 80 The sash closed position shown in Figure 4 the nose 10 is at the closed end 11d of the slot and the element 8 is an interference fit in the recess 9. The final movement of the sash to the closed position is achieved through the engagement of cam surface 10b with guide surface 11b on rotating the lever 7. Movement of the sash to the closed position merely by pulling lever 7 is prevented by engagement of cam surface 10a with guide surface 11a.
- 85 To open the window the lever 7 is simply rotated in an anti-clockwise direction, cam surface 10a engages and moves over guide 90
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surface 11a to move the sash frame away from the window frame until the lever 7 is in the open position and the sash can be pushed open. No force has to be applied in the direction of opening during the initial outward movement resulting from the engagement of the cam surface 10a and guide surface 11a it is only necessary to rotate the lever 7 to the open position.

It will be appreciated from the foregoing that the nose 10 and slot 11 operate in similar manner to a worm gear i.e. the nose 10 is shaped as part of the helical thread of a worm tooth and the slot is shaped as part of a worm in which the nose meshes. The pitch and angle of the nose 10 can be altered so that the mechanical advantage gained can be varied as required to overcome any frictional resistance to opening and closing movements of the sash. Furthermore the nose 10 may be shaped as a larger part or even a complete revolution of thread so that the extent of initial opening movement and closing movement obtained by engagement of the nose 10 in the slot 11 can be varied as required. When the nose 10 is shaped as a complete revolution of thread the grip portion of the lever 7 may be omitted and the boss 7a provided with a spindle adapted to accept a key or similar member for rotating the nose 10.

It will also be appreciated that the location of element 8 in the recess 9 as well as ensuring the sash frame is correctly aligned relative to the window frame during closing and opening movement of the sash also prevents any undesirable twisting or turning of the sash frame about its hinges in the directions of arrows B (Figures 2 to 4) during closing and opening movement of the sash.

Figure 6 illustrates a modification to the striker plate shown in Figures 1 to 5. The recess 9' is closed on all sides so that during engagement of the element 8 in the recess 9', any undesirable twisting or turning movement of the sash on its hinges during opening or closing of the sash is prevented.

Referring now to Figure 7 there is shown a centre hung pivot sash 20. The sash frame 21 has a peripheral recess 22 in the outer edge in which a weather seal 23 made from resilient material is located. In the closed position the weather seal engages the window frame 24 and, as shown, is inclined so as to resist opening movement of the sash in the direction of arrow A. The resistance to opening movement is therefore considerably greater than the resistance to closing movement and the user has to apply excessive force in the direction of arrow A to overcome the frictional resistance of the seal to open the sash. The frictional resistance to opening is greatest for the initial movement and the use of excessive force during this movement results in twisting or turning of the sash frame causing wear to the hinges. The problem is not so great for closing movement of the sash

where the frictional resistance of the seal is less but some wear of the hinges still occurs. The problem is overcome by the fastener according to the present invention. The outward force necessary to move the sash frame a sufficient distance to overcome the frictional resistance of the seal 23 to opening movement is provided through the engagement of the cam surface 10a with the guide surface 11a on rotation of the lever 7 from the closed position. The user does not have to push in the direction of opening to overcome the frictional resistance of the seal 23 and a smooth opening of the sash without any undesirable twisting or turning on the hinges thus obtained. Similarly frictional resistance to closing is overcome through the engagement of the cam surface 10b with the guide surface 11b on rotation of the lever 7.

Although the fastener has been described with reference to a side hung sash and a horizontal centre hung pivot sash it will be understood that the fastener may be used with top hung or vertical hung pivot sashes as well as doors or the like.

The above described fastener may be modified in a number of ways, for example the element 8 may be on the striker plate and the recess 9 in the base. The element and recess may have any suitable complementary configurations. The nose 10 may be on the striker plate and the slot 11 in the lever. The handle may include a security device, for example a lock for locking the first member in the closed position. Conveniently the device comprises a barrel lock located in the lever boss 7a. The fastener may be secured by any suitable means to metal or plastics frames as well as wooden frames. The invention is applicable to right and left handed fasteners, a left handed fastener being the mirror image of the above described right handed fastener.

It will be appreciated that the complementary formations may be provided on any fastener of the kind specified and that only one cam surface and one guide surface may be provided to facilitate movement of the first member to the closed position.

Finally, it will be understood that the term 'slot' as used herein includes any shape or configuration of opening or recess having two opposed side walls forming guide surfaces for engagement with the cam surfaces. Thus the slot 11 may be open ended or closed at both ends and may be formed without a base portion.

WHAT WE CLAIM IS:

1. A fastener of the kind specified wherein cam means provided on one of said lever and striker plate is engageable with guide means provided on the other of said lever and striker plate on rotation of the lever during closing movement of the first member to move the first member to said closed position and complementary formations provided on said

- handle and striker plate are engageable with one another during closing movement of the first member to align the first and second members relative to one another so that in subsequent rotation of the lever the cam means engages the guide means to move the first member to the closed position and the complementary formations co-operate with one another to prevent movement of the first member in a direction transverse to the direction of closing movement of the first member.
2. A fastener according to Claim 1 wherein the complementary formations comprise an element and a recess.
3. A fastener according to Claim 2 wherein the element is wedge shaped.
4. A fastener according to Claim 2 or Claim 3 wherein the element is on the handle.
5. A fastener according to Claim 2 or Claim 3 wherein the element is on the striker plate.
6. A fastener according to Claim 4 or Claim 5 wherein the element is formed integrally with the handle or the striker plate.
7. A fastener according to any one of the preceding claims wherein the handle has a pair of relatively spaced stops for limiting rotational movement of the lever.
8. A fastener according to any one of the preceding claims wherein the handle has a base on which the lever is rotatably mounted and the base is adapted to be mounted on the first member and the striker plate is adapted to be mounted on the second member.
9. A fastener according to any one of the preceding claims wherein the cam means and guide means comprise a cam surface and a guide surface respectively, the cam and guide surfaces being constructed and arranged so that in use the cam surface engages the guide surface on rotation of the lever in one sense to move the first member to the closed position.
10. A fastener according to Claim 9 wherein the cam means and guide means comprise a further cam surface and a further guide surface respectively, the further cam and guide surfaces being constructed and arranged so that in use the further cam surface on rotation of the lever in the opposed sense to move the first member away from the closed position.
11. A fastener according to Claim 10 where in the cam surfaces are formed by the opposed faces of a nose and the guide surfaces are formed by the opposed side walls of a slot.
12. A fastener according to Claim 11 where in the nose is one the lever and the slot is in the striker plate.
13. A fastener according to Claim 11 where in the nose is on the striker plate and the slot is in the lever.
14. A fastener according to Claim 12 or Claim 13 wherein the nose is formed integrally with the lever or the striker plate.
15. A fastener according to any one of the preceding claims wherein the handle has a security device for locking the first member in the closed position.
16. A fastener according to Claim 15 wherein the device comprises a barrel lock mounted in the lever boss.
17. A fastener according to Claim 1 substantially as herein described with reference to Figures 1 to 5 of the accompanying drawings.
18. A fastener according to Claim 1 substantially as herein described with reference to Figures 1 to 5 of the accompanying drawings as modified by Figure 6 of the accompanying drawings.

AUDREY E. KNOWLES
Chartered Patent Agent
Agent for the Applicant
Ravensbrook House
161 Bristol Road
Edgbaston
Birmingham. B5 7UA

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Sheet 1₄

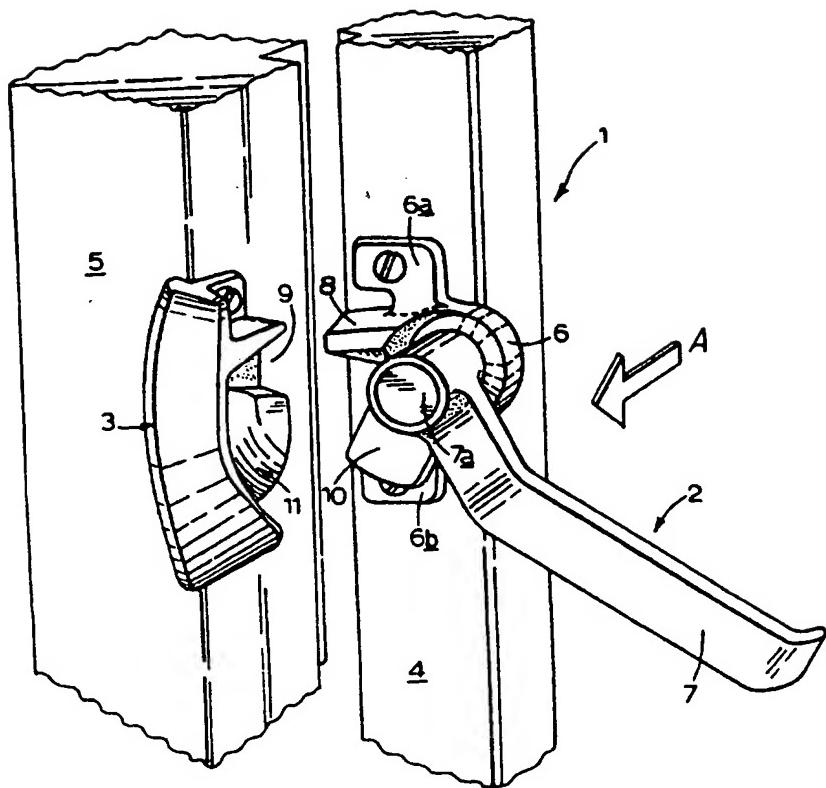


FIG.1.

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Sheet 2

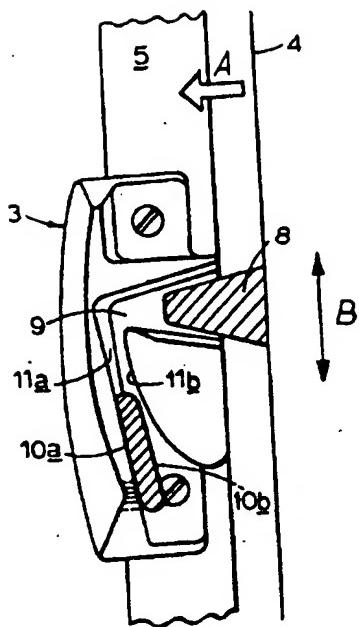


FIG.2.

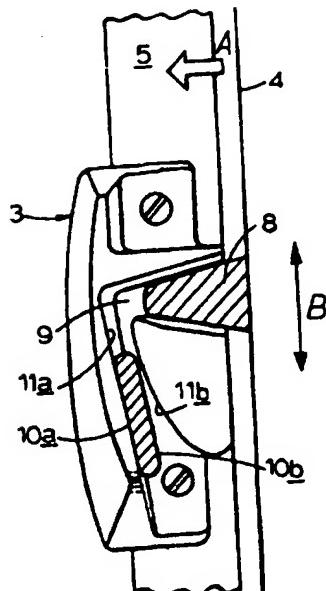


FIG.3.

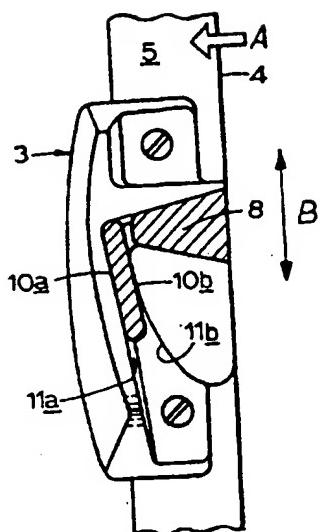


FIG.4.

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Sheet 3

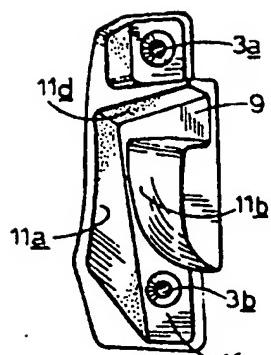


FIG.5.

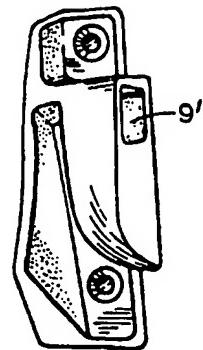


FIG.6.

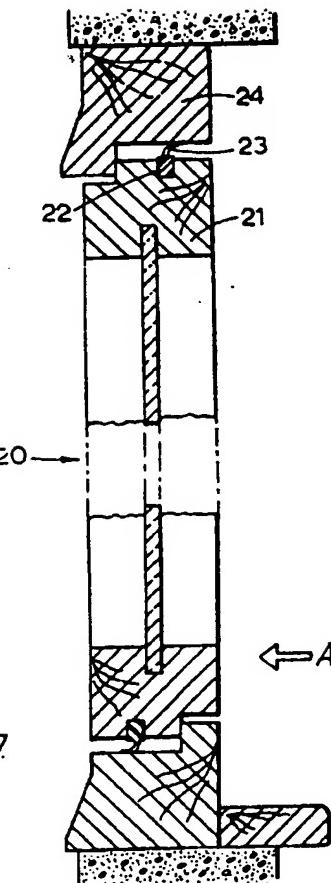


FIG.7.